Orthogonality

Inner Product

Sine and Cosine Identities

$$\langle f,g \rangle = \int_a^b f(t)g(t) dt$$
  
- orthogonal if  $\langle f,g \rangle = 0$ 

$$\langle f,g \rangle = \int_{0}^{b} f(t)g(t) dt$$

$$\int_{0}^{T} \sin(gitnt/T) dt = C$$
- orthogonal :F  $\langle f,g \rangle = 0$ 

$$\int_{0}^{T} \cos(gitnt/T) dt = \begin{cases} 0, & n \neq 0 \\ T, & n = 0 \end{cases}$$

$$\int_{0}^{T} Sin(\hat{a}irmt/T) cos(\hat{a}iint/T) dt = 0$$

$$\int_{0}^{T} Sin(\hat{a}irmt/T) Sin(\hat{a}irnt/T) dt = \begin{cases} 0, & m \neq n \\ \forall a, & m = n \end{cases}$$

$$\int_{0}^{T} Cos(\hat{a}irmt/T) cos(\hat{a}irnt/T) dt = \begin{cases} 0, & m \neq n \\ \forall a, & m = n \end{cases}$$

-Significance?

- · If  $\langle f,g \rangle = 0$  : It g are distinct from one another and orthogonal.
- · If <f,3>=1 : f & g have silinarities between them

## Similarity Coefficient

$$C = \frac{\langle f, g \rangle}{\langle g, g \rangle}$$